Primary energy need: 1 kWhpe/m².year
(Calculation method: RD: 47/2007)

ENERGY CONSUMPTION

<table>
<thead>
<tr>
<th>Energy-intensive building</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>231 à 350</td>
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<td>331 à 450</td>
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<td>&gt; 450</td>
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</tbody>
</table>

Building Type: Office building < 28m
Construction Year: 2020
Delivery year: 2021
Address 1 - street: Calle Jimena Fernández de la Vega, 101 33384 GIJÓN, España
Climate zone: [Cfb] Marine Mild Winter, warm summer, no dry season.

Net Floor Area: 1 243 m²
Construction/refurbishment cost: 1 300 000 €
Cost/m²: 1045.86 €/m²

Certifications:

General information

A STORY OF INTEGRATION
Contributing more energy to the grid than is consumed is the ideal to which all buildings aspire. Moving from wish to reality is possible with the integration of photovoltaic production into the architecture.

The design of the building was initiated in 2006, within a European Union LIFE program, and was conceived to be a replicable stand-alone building solution. The development of the project evolved into a Net Zero connected building concept, dispensing with the stand-alone requirement. It incorporates passive and active measures of very high efficiency, electrifying the demand consumed by the building, avoiding other fuels, generating renewable energy for self-consumption and exporting surpluses to the grid. Thus, the project is the response to a search for maximum comfort and habitability, within a well understood sustainable approach, thanks to the balance between passive and active systems of the building and as a result of the debate held between all the work teams.

Initially, the building was conceived to have the capacity to be energetically autonomous, so, from the first designs, it seeks to minimize energy demand with passive systems. The location on the site and the orientation allows to decrease its environmental impact and improves uses without increasing energy consumption. In the project, and in line with the current trend of buildings with neutral energy balance, it was dispensed with possible energy storage batteries, finally resulting in a building that, due to its technical characteristics, offers a positive balance by generating more energy than it is able to consume.

The initial idea was to show the capabilities of this building (which has a built area of 1,488 m² distributed in a first floor, first floor, two upper floors and roof) from a common access, which is achieved with the walkway that crosses the photovoltaic pergola and shows the main behavior of the building. Formally, at the birth of the idea, the project was conceived as a crack that emerged from the ground and developed along the south and north facade; while the west and east were folds of the topography vertically. This glass crack served to incorporate the technical systems in the facades. The eastern and western walls, in their powerful thickness, house the passage of bulky installations, as well as being a ventilated chamber of the building’s skin.

Vertically, the three floors are joined to the first floor by an open vertical core in a spiral, which creates a dynamic effect in this space. Inside it, an elevator in a concrete and glass box, displaying the technology, including the energy recuperator with batteries that charge with the solar energy provided by the panels and the energy generated in the down cycles, being able to perform 100 up cycles disconnected from the mains.

The vertical core connects the upper floors with the first floor, the rest and recreation areas inside the building, around a large courtyard that serves as a meeting point.

Thus, a project has been carried out in a sustainable location and connected to the community, with efficient use of water, great indoor air quality (control per floor with air quality probe) and high thermal comfort, use of regional materials, efficient facilities and a comprehensive plan for commissioning and monitoring all facilities.

All the installations are monitored and controlled by a management software, which provides valuable real-time monitoring data on the building’s performance.
The photovoltaic pergola on the main south facade marks the entrance to the building, with a dual function of solar filtration and energy collection.

**Performance.** As mentioned above, there is a balance between the building’s passive and active systems as a result of discussions between the teams working on the project. The passive measures determine the following building design parameters: orientation, insulation, natural lighting, green roof, ventilated façade, shading elements, structural inertia and natural ventilation. The main active systems implemented in this building are the photovoltaic installation, the air conditioning system with thermo-activated slabs and underfloor heating, ventilation with heat recovery, monitoring and decision making control in air conditioning, lighting and energy.

The balance of existing systems allows the building spaces to have optimal comfort and habitability for the development of activities, encouraging the creative development of people as they are in a pleasant environment. The response of users in the media and social networks confirms this and will be a crucial in the follow-up of satisfaction surveys for Leed certification.

**Energy and environmental certifications.** The building has energy certification A. LEED GOLD certification, which means it is among the most sustainable buildings. In this sense, from the beginning of the project, the aspects related to high energy efficiency such as indoor environment quality, use of renewable energies, efficiency in water consumption, minimum environmental impact of the construction using a careful selection of regional and non-polluting materials, etc., and meeting demanding requirements such as a sustainable location and connected to the community, have been incorporated on a voluntary basis, corrective measures taken such as reduction of the heat island effect, efficient use of water, indoor air quality (controlled per floor with an air quality probe) and high thermal comfort, use of regional materials, efficient installations and an exhaustive commissioning and monitoring plan for all installations, which is also useful for user satisfaction surveys.
THE BUILDING IN FIGURES

- Built on a 1,050 m2 site
- Total built surface area 1,488.77 m2, of which 361.74 m2 are for the garage
- The offices occupy 1,024.58 m2
- 102.45 m2 have been set aside for the installations
- The photovoltaic pergola generates more than 60 kWp
- The glass assembly has a thermal transmittance coefficient of 0.7 and a solar factor of 0.3
- 60,000 liters is the tank capacity of the rainwater harvesting system
Data reliability

Assessor

Photo credit

Tania Crespo

Stakeholders

Contractor

Name: Gesyges

https://greenspacepctg.com

Construction Manager

Name: Gesyges

Stakeholders
Owner approach of sustainability

The design of the building began in 2006, within a LIFE program of the European Union, and was conceived to be a replicable autonomous building solution. The development of the project evolved towards a Net Zero concept of a connected building, dispensing with the autonomous requirement. It incorporates passive and active measures of very high efficiency, electrifying the demand consumed by the building, avoiding other fuels, generating renewable energy for self-consumption and exporting surpluses to the electricity grid. Thus, the project is the answer to a search for maximum comfort and habitability, within a well understood sustainable approach, thanks to the balance between the passive and active systems of the building as a result of the debate between all the work teams.

Initially, the building was conceived to have the ability to be energetically autonomous, which is why, from the first designs, it seeks to minimize energy demand with passive systems. The location on the ground and the orientation allow to reduce its environmental impact and improve indoor uses without increasing energy consumption. In the project, and in line with the current trend of buildings with a neutral energy balance, possible energy storage batteries were dispensed, finally resulting in a property that, due to its technical characteristics, offers a positive balance by generating more energy than it is able to consume.

Architectural description

The initial idea was to show the capabilities of this building (which has a constructed area of 1,488 m2 distributed in a ground floor, ground floor, two upper floors and roof) from a common access point, which is achieved with the walkway that crosses the photovoltaic pergola and shows the main behavior of the building. Formally, at the birth of the idea, the project was conceived as a crack that arose from the ground and developed along the south and north façade; while the west and east were folds of the vertical topography. This glass crack served to incorporate the technical systems in the facades. The east and west walls, in their powerful thickness, house the passage of the voluminous facilities, as well as being a ventilated chamber of the building’s skin.

Vertically, the three floors are joined to the lower ground by an open vertical core generated in a spiral, which causes a dynamic effect in this space. Inside it, an elevator in a concrete and glass box, shows the machinery, exhibiting the technology it incorporates, with the energy recovery with batteries that charge with the solar energy provided by the panels and the energy generated in the descent cycles, being able to carry out 100 uphill cycles disconnected from the electrical network.

The vertical core communicates the upper floors with the ground floor, the areas for rest or recreation use within the building, around a large patio which they serve as a meeting point.

Thus, a project has been carried out in a sustainable location and connected to the community, with efficient use of water, indoor air quality (control by plant with air quality probe) and high thermal comfort, use of regional materials, efficient facilities and a comprehensive start-up and monitoring plan for all facilities.

Energy

Energy consumption

Primary energy need : 1,00 kWhpe/m².year
Primary energy need for standard building : 72 500,00 kWhpe/m².year
CEEB : 0.0558
Breakdown for energy consumption :
Non-renewable Primary Energy Consumption:
Heating  6.12 kWh / m² year
DHW 3.14 kWh / m² year
Refrigeration 5.50 kWh / m² year
Lighting 20.73 kWh / m² year
Refrigeration Demand: 19.9 kWh / m² year
Heating demand: 18.3 kWh / m² year

Renewables & systems
Systems

Heating system:
- Heat pump
- Low temperature floor heating
- VAV System

Hot water system:
- Heat pump

Cooling system:
- Reversible heat pump
- VRV Syst. (Variable Refrigerant Volume)
- Radiant ceiling

Ventilation system:
- Double flow heat exchanger

Renewable systems:
- Solar photovoltaic

Renewable energy production: 100,00%

Smart Building

BMS:
monitoring

Environment

Water management

60,000-liter tank for treating rainwater and its use in cisterns and irrigation networks

Products

Product

UPONOR
josemanuel.santiago@uponor.com
Product category:

OTIS
gijon@otis.com
https://www.otis.com/es/es
Product category:
Urban environment

The building has an implantation on the land that allows the best use of environmental resources. The regulations, the design and the Leed certification criteria oblige us to minimize the environmental impact on the environment.

The orientation of the building has managed to illuminate the workspaces in the building with a homogeneous light, with its transparent opening on the north façade, and with a light filtered by the photovoltaic panels on the south façade. The opaque West and East façades protect the users of the building from glare.

Land plot area

Land plot area : 1 050,00 m²

Built-up area

Built-up area : 35,00 %

Green space

Green space : 700,00

Parking spaces

13 places

Reasons for participating in the competition(s)

Incorporación de elementos innovadores: proceso de edificación, accesibilidad, sostenibilidad, eficiencia energética y tecnología.

La principal innovación del edificio es la integración de manera equilibrada de distintos sistemas activos y pasivos que han permitido que en su conjunto sea un referente en cuanto a proceso de edificación, accesibilidad, sostenibilidad, eficiencia energética y tecnología.

Un ejemplo de esta integración es el sistema fotovoltaico permite que la energía producida no consumida por el edificio se vierte a la red, funcionando como generación distribuida Smartgrid. Y a la vez que con la orientación dispuesta se consigue un mejor rendimiento en la instalación fotovoltaica con vidrios verticales en fachadas este y oeste, y vidrios con inclinación en la fachada sur.
La disposición de la pégola fotovoltaica protege al edificio de la carga térmica por radiación. La instalación fotovoltaica forma parte de la estrategia de control de consumo energético del edificio en su acondicionamiento térmico. El sombreadero de la pégola en la fachada sur, siguiendo criterios de arquitectura bioclimática, junto con la definición de las envolventes, fachada ventilada, construida con entramados de madera y aislamiento interior y exterior, vidrios de triple acristalamiento y control solar, y cubierta con ajardinamiento para reducir el efecto isla de calor, permiten una disminución del consumo de energía en la regulación térmica del edificio.

La instalación de Climatización utiliza un sistema de producción por bomba de calor para la generación de energía térmica (frío o calor) con sistema de recuperación automática entre zonas del edificio con exceso o demanda. Transmi...
una reducción de cualquier coste por este concepto. Que añadido a la producción eléctrica exportada permite obtener un beneficio ecológico.

**Herramientas para la monitorización de consumos a lo largo del ciclo de vida del edificio**

El conjunto de las instalaciones se encuentra monitorizado y controlado mediante software de gestión, que permite disponer en tiempo real de valiosos datos de seguimiento del comportamiento del edificio. La monitorización permite la toma de decisiones y ejecutar medidas correctoras. Los consumos eléctricos monitorizados en tiempo real y las comparativas de consumo contra producción a lo largo de distintos días, sirven para vigilar el correcto funcionamiento de la instalación y garantizar un buen rendimiento.

**Building candidate in the category**

Users' Choice